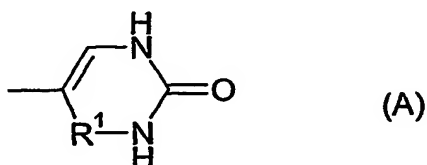


Claims

1. A process for the production of an ^{18}F -labelled tracer which comprises
 5 treatment of a solid support-bound precursor of formula (I):



wherein the TRACER is of formula (A):

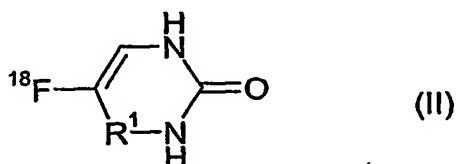


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or an amine protected derivative thereof, wherein Y^- is an anion, preferably trifluoromethylsulphonate (triflate) anion; and

- R^1 is either (i) a group $\text{CH-NP}^{1\text{A}}\text{P}^{2\text{A}}$ in which $\text{P}^{1\text{A}}$ and $\text{P}^{2\text{A}}$ are each independently
 15 hydrogen or a protecting group, or (ii) a carbonyl group;

with $^{18}\text{F}^-$ to produce the labelled tracer of formula (II)



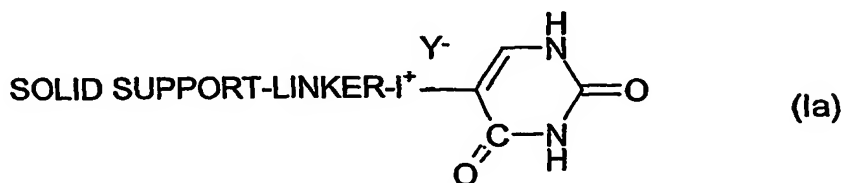
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or an amine protected derivative thereof, wherein R^1 is as defined for the compound of formula (I);

optionally followed by:

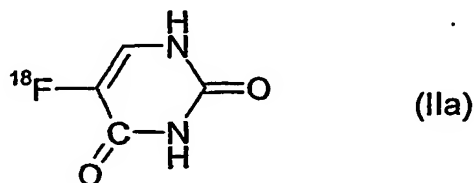
- (i) removal of excess $^{18}\text{F}^-$, for example by ion-exchange chromatography; and/or
 25 (ii) removal of any protecting groups; and/or
 (iii) removal of organic solvent; and/or
 (iv) formulation of the resultant compound of formula (II) as an aqueous solution.

2. A process according to claim 1 for the production of 5[¹⁸F]fluorouracil which comprises treatment of a solid support-bound precursor of formula (Ia):



or an amine protected derivative thereof, wherein Y⁻ is an anion, preferably trifluoromethylsulphonate (triflate) anion;
with ¹⁸F⁻ to produce the labelled tracer of formula (IIa)

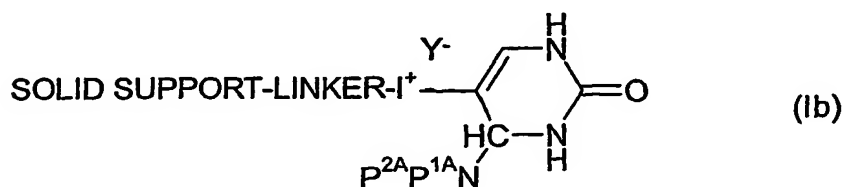
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or an amine protected derivative thereof, optionally followed by:

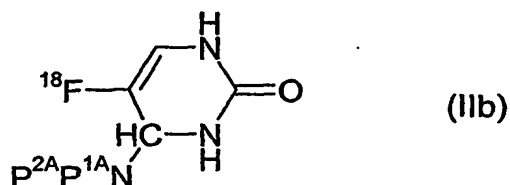
- 15 (i) removal of excess ¹⁸F⁻, for example by ion-exchange chromatography; and/or
(ii) removal of organic solvent; and/or
(iii) removal of any protecting groups; and/or
(iv) formulation of the resultant compound of formula (IIa) as an aqueous solution.

20 3. A process according to claim 1 for the production of 5[¹⁸F]fluorocytosine which comprises treatment of a solid support-bound precursor of formula (Ib):



or an amine protected derivative thereof, wherein Y^- is an anion, preferably trifluoromethylsulphonate (triflate) anion, P^{1A} and P^{2A} are independently hydrogen or a protecting group;
with $^{18}F^-$ to produce the labelled tracer of formula (IIb)

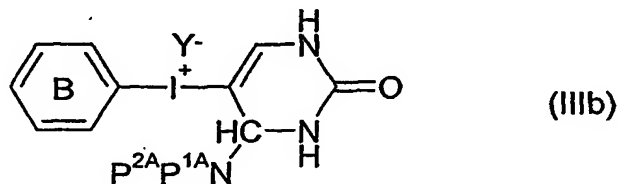
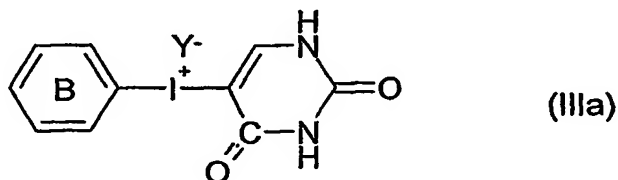
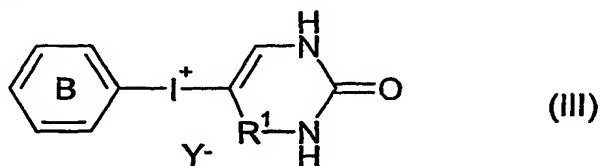
5



or an amine protected derivative thereof, wherein P^{1A} and P^{2A} are as defined for the compound of formula (Ib), optionally followed by:

- 10 (i) removal of excess $^{18}F^-$, for example by ion-exchange chromatography; and/or
(ii) removal of organic solvent; and/or
(iii) removal of any protecting groups; and/or
(iv) formulation of the resultant compound of formula (IIb) as an aqueous solution.

- 15 4. A process for the production of an ^{18}F -labelled tracer which comprises treatment of a compound of formula (III), (IIIa), or (IIIb):



20

or an amine protected derivative thereof, wherein R^1 , P^{2A} , P^{1A} , and Y^- are as

defined in claim 1, and phenyl ring B is optionally substituted with one to five substituents independently selected from halo, C₁₋₆ alkyl, C₁₋₆ haloalkyl, hydroxy, C₁₋₆ alkoxy, amino, C₁₋₆ hydroxyalkyl, and nitro; with ¹⁸F⁻ to produce the labelled tracer of formula (II), (IIa), or (IIb) respectively as
 5 defined in claims 1 to 3 or an amine protected derivative thereof, optionally followed by:

- (i) removal of excess ¹⁸F⁻, for example by ion-exchange chromatography; and/or
- (ii) removal of any protecting groups; and/or
- 10 (iii) removal of organic solvent; and/or
- (iv) formulation of the resultant compound of formula (II), (IIa), or (IIb) as an aqueous solution.

5. A process for the production of a ¹⁸F-labelled tracer of formula (II), (IIa), or (IIb)
 15 according to any one of claims 1 to 4, for use in PET.

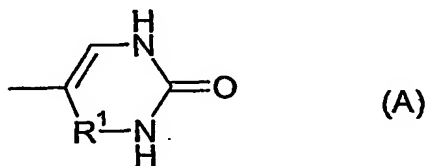
6. A compound of formula (I):



20

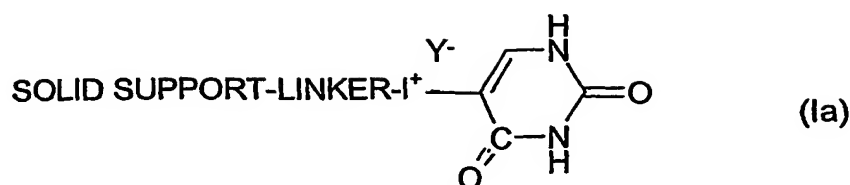
Y⁻

wherein the TRACER is of formula (A):



25 or an amine protected derivative thereof, wherein Y⁻ is an anion, preferably trifluoromethylsulphonate (triflate) anion; and R¹ is either (i) a group CH-NP^{1A}P^{2A} in which P^{1A} and P^{2A} are each independently hydrogen or a protecting group, or (ii) a carbonyl group.

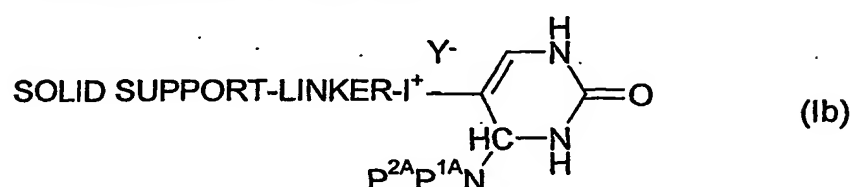
30 7. A compound of formula (Ia):



or an amine protected derivative thereof, wherein Y^- is an anion, preferably trifluoromethylsulphonate (triflate) anion.

5

8. A compound of formula (Ib):



or an amine protected derivative thereof, wherein Y^- is an anion, preferably trifluoromethylsulphonate (triflate) anion, P^{1A} and P^{2A} are independently hydrogen or a protecting group.

10

9. A radiopharmaceutical kit for the preparation of an ^{18}F -labelled tracer for use in PET, which comprises:

- 15 (i) a vessel containing a compound of formula (I), (Ia), or (Ib) as defined in any one of claims 1 to 3 or a compound of formula (III), (IIIa), or (IIIb) as defined in claim 4 or an amine protected derivative thereof; and
- (ii) means for eluting the vessel with a source of $^{18}F^-$;
- (iii) an ion-exchange cartridge for removal of excess $^{18}F^-$; and optionally
- 20 (iv) a cartridge for solid-phase deprotection of the resultant product of formula (II), (IIa), or (IIb), as defined in any one of claims 1 to 3.

10. A cartridge for a radiopharmaceutical kit for the preparation of an ^{18}F -labelled tracer for use in PET which comprises:

- 25 (i) a vessel containing a compound of formula (I), (Ia), or (Ib) as defined in any one of claims 1 to 3 or a compound of formula (III), (IIIa), or (IIIb) as defined in

claim 4 or an amine protected derivative thereof; and
(ii) means for eluting the vessel with a source of $^{18}\text{F}^-$.

11. A method for obtaining a diagnostic PET image which comprises the step of
5 using a radiopharmaceutical kit according to claim 9 or a cartridge for a
radiopharmaceutical kit according to claim 10.